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THE  
ONTARIO WATER RESOURCES  
COMMISSION

WATER POLLUTION (AND SANITARY) SURVEY  
of the  
WEST ANNEX AND HILLCREST SUBDIVISIONS  
TOWN OF COCHRANE

1971



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WATER POLLUTION AND SANITARY SURVEY

of the

WEST ANNEX AND HILLCREST SUBDIVISIONS

in the

TOWN OF COCHRANE

DISTRICT OF COCHRANE

June, 1971

The Division of Sanitary Engineering

District Engineers Branch

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## I     INTRODUCTION

Water pollution and sanitary surveys were conducted at the West Annex and Hillcrest Subdivisions in the Town of Cochrane in June of 1971. The purpose of the surveys was to locate and evaluate all existing sources of pollution in the two subdivisions and to determine the quality of the domestic ground water supplies serving the Hillcrest Subdivision. Such surveys are performed routinely by the Division of Sanitary Engineering of the Ontario Water Resources Commission as a basis for determining water supply and sewage servicing requirements.

## II GENERAL

The Town of Cochrane is in the District of Cochrane and is located approximately 70 miles southeast of the Town of Kapuskasing. It is accessible via Highway No. 11.

The town is situated on a claybelt, primarily composed of clay and silts which is representative of the clay belts in Northern Ontario. Generally, the terrain is of a flat and gently rolling nature.

Presently, the Town of Cochrane supports a population of 4,864. Over the past eight years, the population has remained relatively stable, with an increase of only 6 per cent since 1963. Population growth is minimal, mainly because of limited employment. A Department of Lands and Forests station, a plywood industry (Cochrane Enterprises) and the Ontario Northland Railway are major employers in the area. The tourist trade also provides some employment during the summer months.

Approximately 90 per cent of the town is serviced with municipal water and sewage disposal facilities. Potable water is drawn from two deep wells and treated. Water treatment facilities include coagulation, settling tanks, gravity filters and gas chlorinators. Water storage is provided by an underground reservoir having a capacity of 300,000 gallons, and an elevated tank having a capacity of 83,000 gallons.

This system has a capacity of 0.85 million gallons per day and presently serves a population of approximately 4,600. The average daily pumpage and the maximum daily pumpage for the year 1970 was 0.48 and 0.58 million gallons respectively. The results of numerous inspections by OWRC staff indicate this treated water supply to be of satisfactory quality.

Treatment of domestic sewage is provided by an aerated lagoon, designed to serve 6,000 people at 100 gallons per person per day. Presently, this system serves approximately 4,350 people and receives an average daily flow of 0.35 million gallons. Over the past few years, the degree of treatment provided by the lagoon was considered to be generally unsatisfactory. Currently, Canadian Mitchell Associates Limited, Consulting Engineers, is proposing various modifications to improve the efficiency of the system.

West Annex Subdivision is situated in the northwest corner of the town.

The subdivision has a potential lot development of 313 lots. An estimated 80 lots are presently developed with an approximate population of 250.

This subdivision is not sewered and hence disposal of domestic wastes is by private septic tank systems.

During the survey it was noted that the septic tank systems were not functioning properly at most of the homes throughout the subdivision. There was visual evidence that the effluent from these units was, either directly or otherwise, gaining access to local roadside, storm water ditches. A number of these ditches contained the liquid waste in the immediate area. During rainstorms, the rain water and the liquid wastes are drained into a swampy area, which is reserved for future development and located immediately south of the developed section. This swampy area is drained by Mandor Creek which flows to the Wicklow River en route to the Fredrick House River.

The Porcupine Health Unit reports that the septic tanks in this area have been malfunctioning for quite some time because of poor soil conditions and inadequate lot sizes.

All of the homes in this subdivision are serviced with potable water by the municipal system.

Hillcrest Subdivision is located in the northeast corner of the town.

The subdivision has a potential lot development of 396 lots. An estimated 100 lots are presently developed with an approximate population of 300.

Disposal of domestic wastes is by private septic tank systems. Similar problems and conditions exist in this subdivision as in the West Annex Subdivision.

A municipal water tap, located at the southwest corner of the subdivision, was installed to provide the residents of this subdivision with potable water; however, this source is not used extensively since the majority of the homes are supplied with water by privately owned wells.



### III SANITARY SURVEY

#### A. Hillcrest Subdivision

##### 1. Field Work

The field work associated with the sanitary survey was conducted on June 15, 1971. During the survey a total of seventeen homes were visited in order to generally assess the bacteriological quality of the drinking water supplies serving the Hillcrest Subdivision. Seven samples were also collected (six from drilled wells and one from a dug well) and submitted to the OWRC Lab in Toronto for chemical analysis. The sampling locations are shown on the accompanying map of the study area.

##### 2. Presentation of Results

###### a. Bacteriological

Results of bacteriological samples obtained during the sanitary survey indicated the presence of coliform organisms in six (35%) of the samples. The density of total coliform organisms varied from 5 to 6,000 per 100 ml of sample. Faecal coliforms were absent in all of the samples examined.

The bacteriological examination results of the samples collected are summarized in Table I and their significance is outlined in the Appendix.

###### b. Chemical

Analytical results of the chemical samples obtained during the sanitary survey indicate that the chemical quality of the private water supplies serving

the subdivision was generally acceptable.

It is noted that the majority of the water supplies sampled contained phenol concentrations in excess of the recommended limit of 1 ppb (parts per billion) set by the Ontario Water Resources Commission. However, the concentrations noted are not known to be hazardous to health.

The results of the analyses performed on the chemical samples are summarized in Table II and their significance is outlined in Appendix I.

### 3. Interpretation of Results

As indicated in the preceding section, the chemical quality of the drinking water supplies sampled during the survey is acceptable.

The presence of coliform organisms in six of the seventeen well supplies sampled could possibly be attributed to poor well construction.

### 4. Discussion

Contamination is often intermittent and may not be revealed by the examination of a single sample.

The examination of a single sample can indicate no more than the conditions prevailing at the time of sampling; a satisfactory result cannot guarantee that the observed conditions will persist in the future. The quality of a water supply can be assessed only by a series of samples over a period of time. In view of the limited number of test

results available, a valid assessment of the water quality cannot be made at this time. The Porcupine Health Unit has agreed to further study the private water supplies. Samples for bacteriological examination will be collected on a routine basis for a set period of time. At the completion of this study, an addendum to this report will be issued outlining the results of the study, the quality of the water and recommendations.

#### IV POLLUTION SURVEY

##### A. West Annex and Hillcrest Subdivisions

###### 1. Field Work

The field work associated with this survey was carried out on June 14, 1971. During the survey, 12 bacteriological samples were obtained throughout the West Annex Area and 4 bacteriological and 2 chemical samples were obtained throughout the Hillcrest Area. The samples were collected from roadside ditches, at points of direct discharge to ditches and from ditches around tile fields. Sampling locations are shown on the accompanying map of the study areas.

Visual evidence of pollutants was noted entering the drainage ditches. In some instances, it was noted that washwater was being discharged from homes directly to the drainage ditches via plastic pipes.

###### 2. Presentation of Analytical Results

Bacteriological examination of the 16 samples obtained from the ditches indicated that 92 per cent contained total and faecal coliform organisms in excess of 8,000 per 100 ml of sample.

The results of the two chemical samples collected indicated the presence of raw sewage in the roadside ditches.

Bacteriological examination and chemical analysis results of the samples collected during the pollution survey are presented in Tables III and IV, respectively.

### 3. Discussion

Results of the chemical and bacteriological samples collected during the survey indicate that domestic wastes are gaining access to roadside ditches. Visual evidence of domestic sewage was noted in small ditches around tile fields used to drain the ponding sewage to the local roadside ditches. It is evident that disposal of wastes by septic tanks in the studied areas is inadequate.

During the survey, a number of local residents complained of the malodorous conditions that develop each year during the summer months.

Such conditions constitute a public health hazard, particularly in areas where children play and are also a potential threat to the safety of private well water supplies.

V CONCLUSIONS

A. Sanitary Survey - Hillcrest Subdivision

An adequate supply of ground water is readily available on an individual basis in this area. However, a further study of all the private installations is required to fully assess the quality of the water supplied. The results of this study will be used to determine whether the installations are acceptable in their initial state for continued use.

B. Pollution Survey - West Annex and Hillcrest Subdivisions

The presence of domestic pollution in both subdivisions is confirmed and is attributed to the malfunctioning of the private waste disposal facilities.

The soil conditions and inadequate lot sizes make correction on an individual basis virtually impossible. Extensions to the municipal sewer system will be required to provide the subdivisions with adequate sewage disposal facilities.

Until such facilities are available, it would be appropriate to suspend further development to eliminate the possibility of increased pollution and associated health hazards.

VI RECOMMENDATION

1. Sewers should be extended to the two subdivisions to clean up the existing problems. Also, further development in the two subdivisions should not take place until the areas are serviced by sewers.

Prepared by:.....

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District Engineers Branch  
Division of Sanitary Engineering

/cs



Ditch draining septic tank overflow  
at rear of 78 Huron Road (Photo 1)



Small ditch draining washwater discharge  
from home at 89 Huron Road (Photo 2)





Septic tank overflow ponding  
at rear of 161 Algonquin (Photo 3)

TABLE IBACTERIOLOGICAL EXAMINATION RESULTSSANITARY SURVEY - June 15, 1971TOWN OF COCHRANEHILLCREST SUBDIVISION

<u>LOCATION</u>	<u>SAMPLE NUMBER</u>	<u>SUPPLY</u>	<u>TOTAL COLIFORM ORGANISMS (100 ml/sample)</u>	<u>FAECAL COLIFORM ORGANISMS (100 ml/sample)</u>
82 Huron	1	Municipal tap	0	0
89 Huron	4	Drilled well	0	0
89B Huron	5	Drilled well	0	0
90 Huron	12	Drilled well	0	0
72 Huron	13	Drilled well	0	0
65 Huron	11	Drilled well	5	0
62 Huron	14	Drilled well	0	0
58 Huron	15	Drilled well	0	0
111 Huron	16	Drilled well	6,000	0
154 Algonquin Road	22	Drilled well	0	0
153 Algonquin Road	21	Drilled well	5	0
160 Algonquin Road	9	Drilled well	5	0
161 Algonquin Road	10	Drilled well	0	0
146 Algonquin Road	20	Drilled well	0	0
165 Algonquin Road	19	Drilled well	0	0
215 Glen Avenue	8	Drilled well	10	0
30 Cree Road	23	Dug well	0	0
39 Cree Road	18	Drilled well	5	0

TABLE IICHEMICAL ANALYSIS RESULTSSANITARY SURVEY - June 15, 1971TOWN OF COCHRANEHILLCREST SUBDIVISION

LOCATION	SOURCE	TREATMENT	HARDNESS as CaCO <sub>3</sub>	ALKALINITY as CaCO <sub>3</sub>	IRON as Fe	CHLORIDE as Cl	pH at Lab	PHENOLS in ppb
89 Huron	Drilled well	Nil	322	330	0.55	2	7.4	2
90 Huron	Drilled well	Nil	310	306	0.05	3	7.4	20
72 Huron	Drilled well	Nil	342	320	< 0.05	4	7.4	12
65 Huron	Drilled well	Nil	440	384	< 0.05	22	7.2	4
62 Huron	Drilled well	Nil	348	346	1.1	3	7.3	0
58 Huron	Drilled well	Nil	346	276	1.4	3	7.4	15
30 Cree	Dug well	Nil	40	34	0.10	3	7.8	3

NOTE: All analyses **except** pH reported in ppm unless otherwise indicated.

TABLE III

BACTERIOLOGICAL EXAMINATION RESULTSTOWN OF COCHRANE - June 15, 1971POLLUTION SURVEYA. WEST ANNEX SUBDIVISION

LOCATION	SAMPLE NUMBER	CONDITIONS	TOTAL COLIFORM ORGANISMS (100 ML/sample)	FAECAL COLIFORM ORGANISMS (100 ML/sample)
5TH St. & St. James	1	Stagnant water in road- side ditch between railroad tracks and James Bay Road. Offensive odour noted.	8,000+	8,000+
47 Victoria	2	Small ditch around tile field drained wastewater to roadside ditch. Offensive odour noted.	8,000+	8,000+
43 Victoria	3	Visible tiles discharging wastewater to roadside ditch.	8,000+	8,000+
End of Victoria near Railway Tracks	4	Roadside ditch draining wastewater to open field near tracks.	8,000+	8,000+
53 Sybil	5	Plastic pipe used to discharge washwater from home at 53 Sybil to ditch. Offensive odour noted.	8,000+	8,000+
46 Sybil	6	Plastic pipe used to discharge washwater from home at 46 Sybil to ditch.	8,000+	8,000+
Nipissing & Sybil	7	Roadside ditch draining wastewater to open field near tracks. Offensive odour noted.	80,000+	8,000+
50 Connaught	8	Two small ditches draining sewage and washwater from home. Sample results seem doubtful.	20	0

TABLE III - cont'd

LOCATION	SAMPLE NUMBER	CONDITION	TOTAL COLIFORM ORGANISMS (100 ML/sample)	FAECAL COLIFORM ORGANISMS (100 ML/sample)
Arthur & Nipissing	9	Roadside ditch draining wastewater to open field near railway tracks. Offensive odour noted.	8,000+	8,000+
End of Arthur	10	Roadside ditch draining wastewater to open field near tracks. Offensive odour noted.	8,000+	8,000+
Gulf Station at Hwy. #11	11	Ditch draining waste-water from rear lot tile field. Oil film was noted.	8,000+	8,000+
B. <u>HILLCREST SUBDIVISION</u>				
Rear of 78 Huron Road	2	Ditch draining septic tank overflow. Very offensive odour noted. (see Photo #1)	80,000+	8,000+
89 Huron Road	4	Small ditch draining wash- water discharge from home. (see Photo #2)	80,000+	8,000+
Rear of 161 Algonquin	7	Septic tank overflow ponding at rear lot. Very offensive odour noted. (see Photo #3)	80,000+	8,000+
Rear of 19 Cree Road	17	Ditch draining septic tank overflow	80,000+	8,000+
88 Huron Road	3	Washwater discharge from home at 88 Huron Road to roadside ditch.	80,000+	8,000+

TABLE IV

CHEMICAL ANALYSES RESULTS

POLLUTION SURVEY - June 15, 1971

TOWN OF COCHRANE

WEST ANNEX SUBDIVISION

<u>LOCATION</u>	<u>SAMPLE NUMBER</u>	<u>5-DAY BOD</u>	<u>SUSPENDED SOLIDS</u>
43 Victoria	1	170	310
39 Arthur	2	140	180

NOTE: All analyses except pH reported in ppm unless otherwise indicated.

## APPENDIX I

### EXPLANATION AND SIGNIFICANCE OF LABORATORY ANALYSES

All bacteriological samples collected were examined by the Department of Health Laboratory in Timmins. Chemical samples were analysed by the Ontario Water Resources Commission Laboratory in Toronto.

#### A. Bacteriological Examination

The Most Probable Number (MPN) technique is used by the Department of Health Laboratories to obtain a direct enumeration of coliform organisms. These organisms are normal inhabitants of the intestines of man and other warm-blooded animals. They are always present in large numbers in sewage and are generally minimal in other water pollutants.

The results of the examinations are reported as "MPN" Coliform Count per 100 ml of sample.

OWRC Guidelines specify that in public water suitable for swimming the coliform, faecal coliform and/or enterococcus geometric mean densities should not exceed 1000, 100 and/or 20 per 100 ml, respectively, in a series of at least ten samples per month.

#### B. Sanitary Chemical Analyses

##### Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (ppm) and is an indication of the amount of oxygen required for the stabilization of decomposable organic matter in the water. The completion of the laboratory test requires five days, under the controlled incubation temperature of 20° C.

### Solids

The value for total solids, expressed in parts per million (ppm), is the sum of the values for the suspended and the dissolved matter in the water. The concentration of suspended matter is generally the most significant of the solids analyses in regard to stream water quality.

The effects of suspended solids in water are reflected in difficulties associated with water purification, depositions in streams, and injury to the habitat of fish.

### Phenols

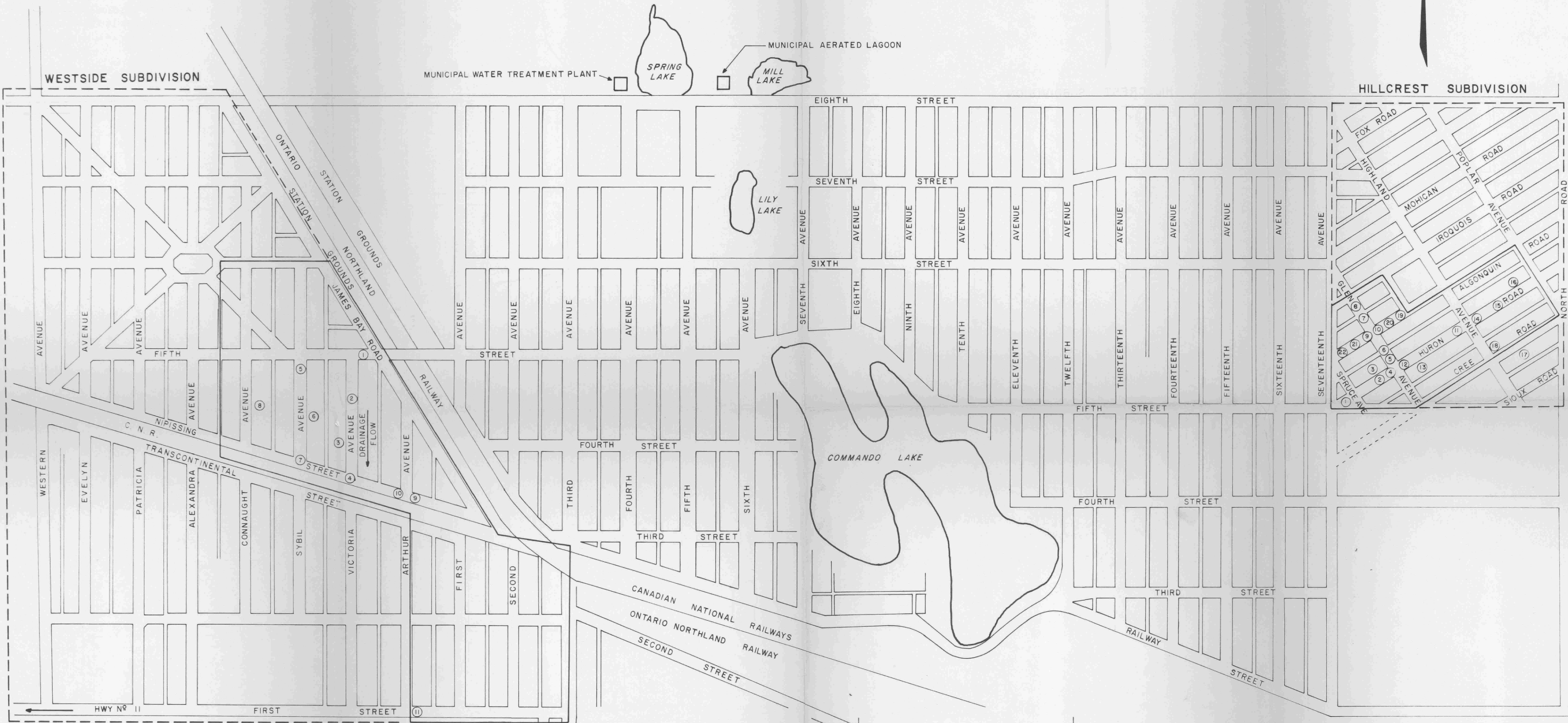
Phenolic wastes arise from the distillation of wood, from gas works, coke ovens, oil refineries, chemical plants, shop dips and from human and animal refuse. This substance is of concern in drinking water supplies because of objectionable tastes produced by its presence. OWRC objectives allow concentrations of phenol in drinking water supplies of no greater than 1 ppb (1 part per billion).



TWP.

OF

GLACKMEYER



DRAINAGE

DRAINAGE

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1971  
W21

TO KAPUSKASING

TO TIMMINS HWY NO 11

TWP.

OF

LAMARCHE

ANNEXED TO COCHRANE

LEGEND

- EXISTING DEVELOPMENT
- - - PROPOSED DEVELOPMENT
- ⑦ SAMPLE NUMBER & LOCATION

Out  
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Water Treat

RECEIVED  
MAR 7 1972  
DIVISION OF SANITARY ENGINEERING  
ONTARIO WATER  
RESOURCES COMMISSION

ONTARIO WATER RESOURCES COMMISSION	
TOWN OF COCHRANE	
WATER POLLUTION AND SANITARY SURVEY	
1971	
SCALE: 1"=300'	
DRAWN BY: R.S.	DATE: JANUARY 1972
CHECKED BY:	DRAWING NO: 72-3-DE



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